

202401UECM3473OE4B

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Review of preview

Started on	Sunday, 7 April 2024, 12:08 PM
Completed on	Sunday, 7 April 2024, 12:08 PM
Time taken	8 secs
Marks	0/8
Grade	0 out of a maximum of 10 (0%)

1 You are given;

Marks: 1

- The number of claims follows a binomial distribution with parameters $m=6$ and λ .
- Claim sizes follow a distribution with mean σ and variance $3\sigma^2$.
- The number of claims and claim sizes are independent.
- λ and σ have a prior probability distribution with joint density function
$$f(\lambda, \sigma) = k\lambda^3(12-\sigma)^3, 0 < \lambda < 1, 0 < \sigma < 12.$$
- During the first year we observe 3 claims and the claims are 3, 2, and 4.
- During the second year we observe 2 claims and the claims are 4, and 6.

Determine the Buhlmann estimate of the expected aggregate loss for the third year. _____

Answer:

X

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Incorrect

Correct answer: 10.363636

Marks for this submission: 0/1.

2 Number of claims for each member of a group follows a Poisson distribution with mean λ . λ varies by insured according to a uniform distribution on $(0, 0.4)$. You are given three years of experience for the group:

Marks: 1

Year	Number of members	Number of claims
1	120	5
2	150	4
3	190	7

The group will have 200 members in year 4. Calculate the Buhlmann credibility premium for the group in year 4.

Answer:

[Make comment or override grade](#)

Incorrect

Correct answer: 8

Marks for this submission: 0/1.

3

Marks: 1

For each exposure in a group, the hypothetical mean of aggregate losses is Θ and the process variance is $e^{0.4\Theta}$. Θ varies by group. Its distribution is gamma with $\alpha = 2$ and $\beta = 1.94$. For three years experience from a group, you have the following data:

Year	Exposures	Aggregate Losses
1	21	85
2	28	100
3	39	118

There will be 51 exposures in the group next year. Calculate the Buhlmann-Straub credibility premium for the group. _____

Answer:

[Make comment or override grade](#)

Incorrect

Correct answer: 176.2509

Marks for this submission: 0/1.

4

Marks: 1

You are given the following:

- A portfolio of risks consists of two classes, A and B.
- The number of claims per year per risk is the same for each member in a class. The distribution for each class is:

class	Number of Claims			
	0	1	2	3
A	0.39	0.31	0.16	0.14
B	0.36	0.29	0.21	0.14

- Class A has 5 times as many insureds as Class B.
- Customers insure risks, all of which must belong to the same class.

A randomly selected customer has the following experience:

- In year 1 the customer insures 5 risks and has 7 claims.
- In year 2 the customer insures 9 risks and has 7 claims.

In year 3 the customer seeks to insure 10 risks.

Determine the Buhlmann-Straub estimate of the number of claims for this customer for year 3. _____

Answer:

[Make comment or override grade](#)

Incorrect

Correct answer: 10.626302

Marks for this submission: 0/1.

5

Marks: 1

For a group dental coverage, you have the following three years of experience from a covered group:

	Number		
	of members	Number of	Aggregate
Year	in group	claims	claims
2010	95	150	40,000
2011	150	175	50,000

2012	110	160	50,000
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There will be 120 members in the next year. The number of claims per member in any year follows a binomial distribution with parameters $m = 7$ and q . q is the same for all members in the group, but varies over groups, and is distributed uniformly over $(0.37, 0.47)$. Claim size follows a gamma distribution with parameters $\alpha = 12$, $\theta = 30$. Claim sizes and claim counts are independent. Calculate the Buhlmann-Straub estimate of aggregate claims in the next year. _____

Answer:



[Make comment or override grade](#)

Incorrect

Correct answer: 56748.100485

Marks for this submission: 0/1.

6

Marks: 1

You are given five classes of insureds, each of whom may have zero or one claim, with the following probabilities:

Class	Number of claims	
	0	1
I	0.85	0.15
II	0.74	0.26
III	0.47	0.53
IV	0.31	0.69
V	0.08	0.92

A class is selected at random (with probability $1/5$), and 5 insureds are selected at random from the class. The total number of claims is 4. If 14 insureds are selected at random from the same class, estimate the total number of claims using Buhlmann-Straub credibility. _____

Answer:



[Make comment or override grade](#)

Incorrect

Correct answer: 9.968

Marks for this submission: 0/1.

7

Marks: 1

For a portfolio of insurance risks, average aggregate losses per exposure have mean θ and variance $8000 + 40000/m_j$, where m_j is the number of exposures in year j . θ varies by risk, and follows a log normal distribution with parameters $\mu = 3$, $\sigma = 0.9$. The following is the experience for this risk over 5 years:

Year	Number of Exposures	Average Losses Per Exposure
1	20	1,500
2	35	2,400
3	55	3,100
4	75	3,400
5	90	3,600

Determine the Buhlmann-Straub estimate of average aggregate losses per exposure in the next year for this risk. _____

Answer:



[Make comment or override grade](#)

Incorrect

Correct answer: 550.48

Marks for this submission: 0/1.

8

You are given the following information about a credibility model:

Marks: 1

Observed Losses	Probability	Bayesian Estimate
10	2/10	22.69
14	1/10	24.69
30	2/10	32.69
34	2/10	34.69
50	3/10	y_5

Determine the Buhmann credibility estimate of the second observation, given that the first observation is 30.

Answer:



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Incorrect
Correct answer: 30.807382
Marks for this submission: 0/1.

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